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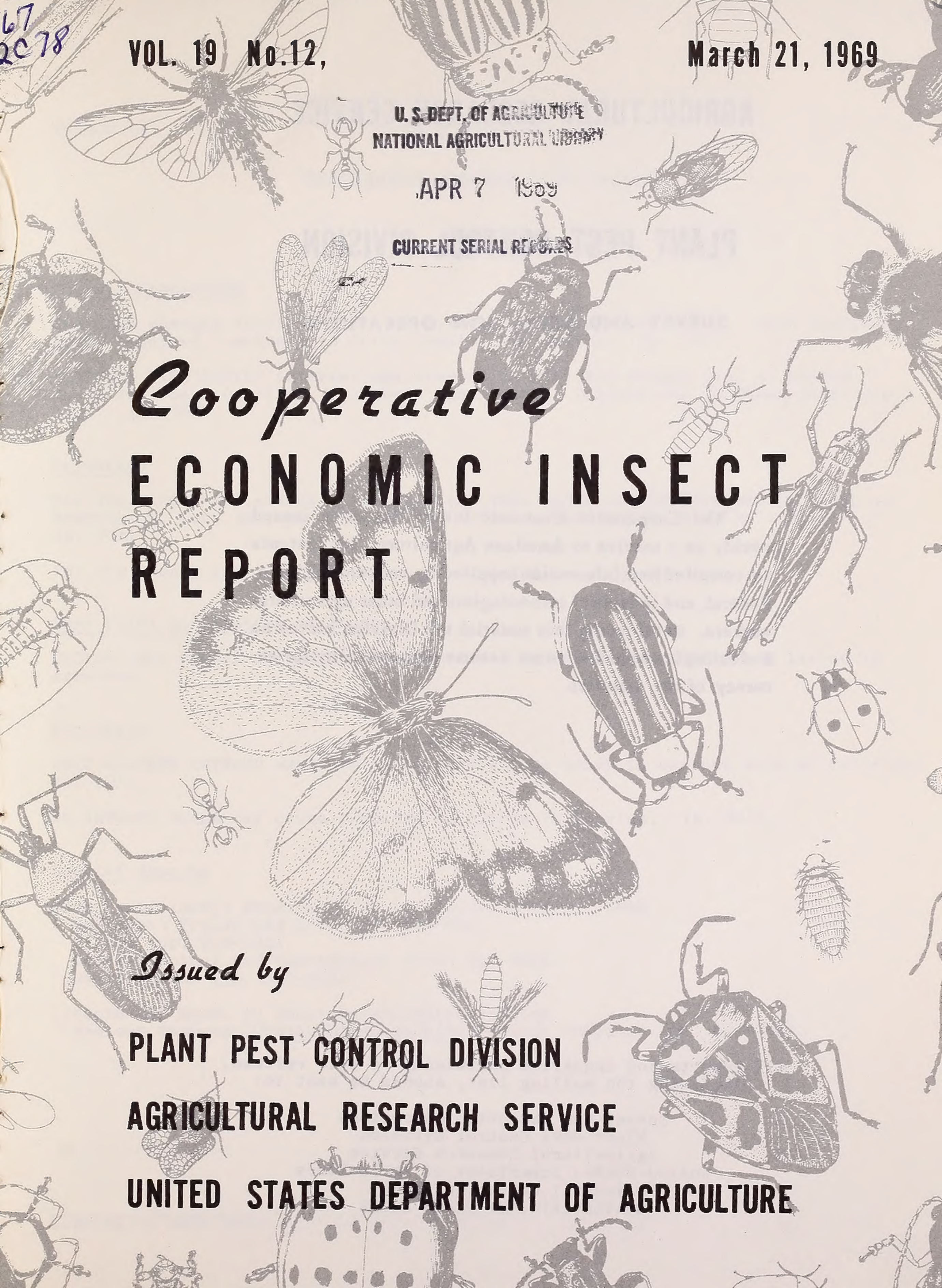

Cooperative ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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United States Department of Agriculture
Federal Center Building
Hyattsville, Maryland 20782

Volume 19 March 21, 1969 Number 12

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

GREENBUG damaged wheat in parts of Rolling Plains area of Texas. Some irrigated wheat required treatment in Curry County, New Mexico. (p. 191).

SOUTHERN PINE BEETLE infestations present on National Forest land in Alabama, North and South Carolina, Tennessee, and Texas. Infestation in Texas worst since 1962. (p. 193).

Detection

New State records include a MEALYBUG (p. 192) and a LEAFCUTTING BEE (p. 193) in Washington, four ANTS in Arkansas (p. 195), and APPLE RUST MITE in Vermont (p. 201).

For new county and island records see page 195.

Some First Occurrences of Season

CLOVER LEAF WEEVIL larvae in California and EASTERN TENT CATERPILLER larvae in Arkansas.

Forecasts

PALE WESTERN CUTWORM expected to be moderate to heavy in eastern area of Colorado. (p. 191).

An ARMORED SCALE may cause problems on citrus in Florida. (p. 203).

Special Reports

Summary of Insect Conditions in the United States - 1968
  Deciduous Fruits and Nuts (pp. 195-203).
  Citrus (pp. 203-205).
  Other Tropical and Subtropical Fruit (p. 205).
  Small Fruits (pp. 205-206).

Insects Not Known to Occur in the United States
  Eyeless Tampans (Ornithodoros moubata (Murry) complex) (pp. 207-208).

Reports in this issue are for week ending March 14 unless otherwise indicated.

CONTENTS

Special Insects of Regional Significance....191

Insects Affecting

Corn, Sorghum, Sugarcane....191
Small Grains....191
Forage Legumes....191
General Vegetables....191
Citrus....192
Ornamentals....192
Forest and Shade Trees....192
Man and Animals....193

Beneficial Insects....193
Federal and State Plant Protection Programs....194
Hawaii Insect Report....194
Corrections....194
Insect Detection....195
Light Trap Collections....195
Summary of Insect Conditions in United States - 1968
  Deciduous Fruits and Nuts....196
  Citrus....203
  Other Tropical and Subtropical Fruit....205
  Small Fruits....205
Insects Not Known to Occur in the United States
  Eyeless Tampans (Ornithodoros moubata (Murray) complex)....207

WEATHER BUREAU'S 30-DAY OUTLOOK

MID-MARCH TO MID-APRIL 1969

The Weather Bureau's 30-day outlook for mid-March to mid-April is for temperatures to average below normal over the Mississippi Valley and the central and southern Plains, as well as the east Gulf States. Above normal temperatures are expected over the Great Basin, the West Coast States, and the mid-Atlantic States, while near normal temperatures are expected elsewhere. Precipitation is expected to exceed normal over most of the South, the Ohio Valley, and the middle Mississippi Valley. Subnormal totals are indicated over California, the Great Basin, the northern Plains, and the upper Mississippi Valley. Elsewhere near normal precipitation is in prospect.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the Weather Bureau. You can subscribe through the Superintendent of Documents, Washington, D.C. 20250. Price $5.00 a year.

WEATHER OF THE WEEK ENDING MARCH 10

HIGHLIGHTS: Cold, sunny weather continued over most of the Nation. The most important precipitation included snow in the southern Rockies and central Great Plains and generous weekend rains along the gulf.

PRECIPITATION: Moist air moved into the Southwest and over the cold Rockies and Great Plains. Nine inches of snow fell at Flagstaff, Arizona, Monday forenoon, and by Tuesday morning 17 inches of new snow had fallen, increasing the snow cover to 29 inches. As moist air moved into the Great Plains, it dumped more heavy snow - only an inch or so in New Mexico and Colorado but 9-12 inches in parts of the Texas Panhandle, 7-13 inches in the Oklahoma Panhandle, and up to 10 inches locally in southwestern Kansas. Flurries occurred on several days in the latter part of the week from the northern Great Plains to the Northeast. Amounts were generally light. Generous weekend rains fell along the Gulf of Mexico from eastern Texas to Georgia and Florida with some areas receiving 1-3 inches of moisture. Rains fell along the coast in the Far Northwest late in the week while heavy snow fell in nearby foothills and mountains. Snow cover in the northern Great Plains and in the Northeast diminished somewhat, and a few bare fields were noted, but the threat of flooding continued. Weather of the week continued on page 195.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

ARMY CUTWORM (*Chorizagrotis auxiliaris*) - OKLAHOMA - Up to 3 per linear foot in northeastern Kiowa County. (Okla. Coop. Sur.).

CORN LEAF APHID (*Rhopalosiphum maidis*) - NEW MEXICO - Light to moderate in Dona Ana County barley. (Campbell).

GREENBUG (*Schizaphis graminum*) - OKLAHOMA - Ranged 40-90 per linear foot in 4 wheatfields, up to 200 per linear foot in 1 field in Tillman County, and 75-85 per linear foot in Altus area of Jackson County. Ranged 0-60 per linear foot in Kiowa and Caddo Counties. Continues very light in Garfield and Wagoner Counties. (Okla. Coop. Sur.). TEXAS - Remained unchanged in panhandle area. In Rolling Plains, continued to damage wheat in parts of Motley, Knox, Stonewall, Wilbarger, and Cottle Counties. Although damage generally decreasing in area, light damage observed in Young, Archer, and Baylor Counties. (Boring). NEW MEXICO - Counts per linear foot averaged 10-30 in barley (ranged 250-300 in one field) and 75-100 in wheat in Chaves County; some irrigated wheat treated in Curry County. (Campbell). CALIFORNIA - Medium on barley in Bakersfield, Kern County. (Cal. Coop. Rpt.).

SPOTTED ALFALFA APHID (*Therioaphis maculata*) - NEW MEXICO - Ranged 5-50 per square foot in 4 alfalfa fields in Roswell and Dexter areas of Chaves County. (Mathews).

CORN, SORGHUM, SUGARCANE

SOUTHWESTERN CORN BORER (*Diatraea grandiosella*) - ALABAMA - About 4 percent of larvae survived in 5 old cornfields in Franklin County; 40-50 percent of stalks girdled and down in 3 fields, 5-15 percent girdled in 2 fields. (Ponder et al.).

SMALL GRAINS

ENGLISH GRAIN APHID (*Macrosiphum avenae*) - CALIFORNIA - This aphid and *Rhopalosiphum padi* medium on barley in Bakersfield, Kern County. Small grains severely damaged by excessive rain and standing water in many locations statewide. (Cal. Coop. Rpt.).

WINTER GRAIN MITE (*Penthaleus major*) - OKLAHOMA - Ranged 90-100 per linear foot on wheat in Altus area of Jackson County. (Okla. Coop. Sur.). TEXAS - Continued to decrease in Archer County. (Boring).

PALE WESTERN CUTWORM (*Agrotis orthogonia*) - COLORADO - Expected to be moderate to heavy in eastern area. (Pruess).

FORAGE LEGUMES

CLOVER LEAF WEEVIL (*Hypera punctata*) - CALIFORNIA - Larvae light on alfalfa in Lancaster, Los Angeles County. (Cal. Coop. Rpt.).

CLOVER HEAD WEEVIL (*Hypera meles*) - MISSOURI - Collected by R.E. Munson at Crane, Stone County, May 11, 1968. This is a new county record. (Munson).

GENERAL VEGETABLES

ONION MAGGOT (*Hylemya antiqua*) - TEXAS - Infesting onion sets at Woodville, Tyler County. (Currie).

CITRUS

Citrus Insect Situation in Florida - End of February - CITRUS RUST MITE (Phyllocoptruta oleivora) infested 75 (norm 62) percent of groves; 54 (norm 41) percent economic. Above normal and into high range for the State, but varies considerably among groves and districts. Expected to hold near current level. Highest districts south, west, and north. TEXAS CITRUS MITE (Eutetranychus banksi) infested 27 (norm 31) percent of groves; 12 (norm 12) percent economic. Near normal low level for this date. Decrease expected, some groves will show increase and few heavy infestations likely to occur. Highest districts north, south, and central. CITRUS RED MITE (Panonychus citri) infested 30 (norm 38) percent of groves; 7 (norm 15) percent economic. Below normal and in low range. Gradual increase expected with some groves developing heavy infestations. Highest districts west, east, and south. SIX-SPOTTED MITE (Eotetranychus sexmaculatus) light in 6 percent of groves. Near normal for this date. GLOVER SCALE (Lepidosaphes gloverii) infested 75 (norm 79) percent of groves; 4 (norm 18) percent economic. PURPLE SCALE (L. beckii) infested 58 (norm 78) percent of groves; 2 (norm 9) percent economic. YELLOW SCALE (Aonidiella citrina) infested 75 (norm 65) percent of groves; 4 (norm 13) percent economic. BLACK SCALE (Saissetia oleae) infested 20 (norm 33) percent of groves; 4 (norm 14) percent economic. CHAFF SCALE (Parlatoria oleae) infested 33 (norm 61) percent of groves; less than 1 (norm 10) percent economic. An ARMORED SCALE (Unaspis citri) present in 16 percent of groves; moderate to heavy in 6 percent. WHITEFLIES and MEALYBUGS below normal and of little importance; increase of whiteflies expected. APHIDS appearing in scattered groves; strong increase expected end of March. (W.A. Simanton (Citrus Expt. Sta., Lake Alfred)).

CALIFORNIA RED SCALE (Aonidiella aurantii) - CALIFORNIA - Medium on lemon trees and fruit in large grove at Santa Paula, Ventura County. (Cal. Coop. Rpt.).

ORNAMENTALS

A MEALYBUG (Rhizoecus cacticans) - WASHINGTON - Collected on roots of African-violet in Whatcom County, September 4, 1965. Determined by D.J. Williams. This is first published record of this mealybug in State. (Jackson, Nonini, Mar. 7).

ARMORED SCALES - FLORIDA - Adults of Ischnaspis longirostris (black thread scale) on leaves of ceriman, February 19, and Gymnaspis aechmeae on leaves of bromeliad, February 18, at St. Cloud, Osceola County. Collected by A.C. Crews. These are new county records. Adults of Aspidiotus spinosus moderate on greenbrier (Smilax sp.) plant at Hobe Sound, Martin County. Collected by E.W. Campbell, August 12, 1968. This is a new Florida Department of Plant Industry host record. (Fla. Coop. Sur.).

FOREST AND SHADE TREES

ENGRAVER BEETLES (Ips spp.) - FLORIDA - Statewide survey conducted by State forest service indicated bark beetles, primarily these pests, caused loss of 293,853 cords of wood during 1968. (South. For. Pest Rptr., Feb.).

SOUTHERN PINE BEETLE (Dendroctonus frontalis) - TENNESSEE - Scattered small spot infestations present in Happy Valley section of Blount County and west of Watts Bar Lake from Rhea County to Anderson County. (Applegate). ARKANSAS - Ground checking of sites, reported in CEIR 19(10):149, revealed another area infested (possibly by this species) east of Hamburg in Ashley County. (Warren).

Southern pine beetle infestations present on National Forest land in ALABAMA, NORTH and SOUTH CAROLINA, TENNESSEE, and TEXAS; on private land in GEORGIA, LOUISIANA, North and South Carolina, and Texas; and on National Park land in Tennessee. Control by removal of infested material through commercial sales being emphasized. Infestation in Texas worst since 1962. About 43,000 trees salvaged on National Forest land in State since July 1968; yielding 1,520,000 board feet of sawtimber and 2,620 cords of pulpwood. On private land in Texas 236,035 infested trees treated during 1968. (South. For. Pest Rptr., Feb.).

PINE NEEDLE SCALE (*Phenacaspis pinifoliae*) - CALIFORNIA - Medium on pine nursery stock in speciality nursery at La Mesa, San Diego County, and light on pines locally in Reedley, Fresno County. (Cal. Coop. Rpt.). NEVADA - Heavy on spruce trees in Elko, Elko County. (Hackett).

A CONIFER SAWFLY (*Neodiprion taedae linearis*) - ARKANSAS - No egg hatch March 10-12 in southern area. (Warren).

EASTERN TENT CATERPILLAR (*Malacosoma americanum*) - ARKANSAS - New larvae observed in Ashley and Drew Counties March 10 and in Hempstead County March 12. (Warren).

ASIATIC OAK WEEVIL (*Cyrtepistomus castaneus*) - MISSOURI - Adults in blacklight trap at Vulcan, Iron County, July 29, 1968. Collected by H.E. Brown. This is a new county record. (Munson).

SMALLER EUROPEAN ELM BARK BEETLE (*Scolytus multistriatus*) - COLORADO - Prevalent in Fort Morgan area of Morgan County, where Dutch elm disease occurs. (Hantsbarger).

CALICO SCALE (*Lecanium cerasorum*) - CALIFORNIA - Adults medium on maple trees locally in Calistoga, Napa County. Not a common scale but periodically appears in widely separated areas. (Cal. Coop. Rpt.).

MAN AND ANIMALS

SCREW-WORM (*Cochliomyia hominivorax*) - One case reported in U.S. March 9-15 in Jim Hogg County, TEXAS. Total of 177 cases reported in portion of Barrier Zone in Republic of Mexico March 2-8 as follows: Territorio sur de Baja California 22, Sonora 46, Chihuahua 9, Coahuila 2, Nuevo Leon 9, Tamaulipas 89. Total of 7 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screw-worm flies released: Texas 55,168,000; Mexico 69,280,000. (Anim. Health Div.).

CATTLE LICE - ALABAMA - Light to medium on scattered beef herds. Currently light in Jefferson, Mobile, and Franklin Counties. (Smith et al.). OKLAHOMA - Mostly *Haematopinus eurysternus* (short-nosed cattle louse) heavy on cattle in Mayes County. (Okla. Coop. Sur.).

BENEFICIAL INSECTS

A LADY BEETLE (*Psyllobora vigintimaculata*) - ALABAMA - Adults observed during winter on magnolia trees in Lee County, feeding on mites and plant fluids. *Mulsantina picta*, dark and light forms, feeding on pine aphids in Lee County. (McQueen).

A LEAFCUTTING BEE (*Megachile concinna*) - WASHINGTON - Found in trap nest of *Megachile rotundata* in Yakima Valley in 1968. First record of this alfalfa seed pollinator in Pacific Northwest. Determined by C.E. Bohart. (Eves, Mar. 7).

FEDERAL AND STATE PLANT PROTECTION PROGRAMS

IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) - TENNESSEE - Survey negative in Bledsoe, Giles, Lincoln, Rhea, and Warren Counties. (Harris et al.).

HAWAII INSECT REPORT

General Vegetables - Adults and grubs of VEGETABLE WEEVIL (*Listroderes costirostris obliquus*) severely damaged 0.25 acre of turnip seedlings in Waimea (Kamuela), Hawaii. (Nakano). All stages of DIAMONDBACK MOTH (*Plutella xylostella*) light on mustard cabbage at Koko Head, Oahu; medium to heavy in some fields at Waimanalo; negligible at Waianae. GREENHOUSE WHITEFLY (*Trialeurodes vaporariorum*) and CARMINE SPIDER MITE (*Tetranychus cinnabarinus*) heavy to severe on snap beans and eggplants at Waianae, generally light to medium at Waimanalo, Oahu. Medium to heavy in scattered plantings of snap beans and eggplants on Kauai. (Yamamoto, Funasaki).

Fruits - Larvae of a NOCTUID MOTH (*Phlegetonia delatrix*) medium, damage heavy on terminals of Java-plum in Hilo, Hawaii. Larvae light, moderate damage on Java-plum foliage along roadside at Pukoo, Molokai. This is a new island record. To date, this species has been found feeding on foliage of Java-plum, mountain-apple, and ohia-lehua and now occurs on Kauai, Oahu, Maui, Hawaii, and Molokai. (Kobayashi, Miyahira).

Ornamentals - PAINTED LADY (*Vanessa cardui*) larvae heavy and severely defoliated common foxglove (*Digitalis purpurea*) in Hilo, Hawaii; new host record for the State. (Himori).

Forest and Shade Trees - A BARK BEETLE (*Xylosandrus compactus*) lightly damaged twigs of *Albizia lebbeck* at Anahola, Kauai. (Sugawa). BARNACLE SCALE (*Ceroplastes cirripediformis*) heavy on fiddlewood trees along Lunalilo Home Road at Koko Head, Oahu. Light and confined to young branches in early January. (Nakao). KIAWE FLOWER LOOPER (*Cosymbia serrulata*) adult collections in light traps increasing in scattered areas on Oahu. Further increase expected as more kiawe trees begin to flower. (Au).

Man and Animals - MOSQUITOES - Collected 520 *Aedes vexans nocturnus* and 3,431 *Culex pipiens quinquefasciatus* in 51 light traps on Oahu during February. *Aedes* low in all areas. *Culex* catches highest at MacKay Radio in Kailua (416). (Mosq. Cont. Br., Dept. of Health).

Household - Large numbers of a CERATOPOGONID MIDGE (*Forcipomyia indecora*) entered homes and caused nuisance during past two weeks in Honolulu (Nuuanu, Alewa Heights, Aina Koa), Kaneohe, and probably elsewhere on Oahu. This insect becomes abundant during wet months and breeds in damp areas such as leaf axils of plants, rotting wood, and stems and roots of dead plants. Other species of midges caused nuisance but this was the most abundant and widespread. (Kim, Chong).

Beneficial Insects - LANTANA HISPID (*Uroplata girardi*) adults and larval mines remain moderate on foliage of lantana at Ulupalakua, Maui. Light on lantana near Kaunakakai on Molokai and along Mahana Road on Lanai. (Miyahira).

Miscellaneous Insects - A female of VAGRANT GRASSHOPPER (*Schistocerca vaga*) captured in wild vegetation at Kaunakakai, Molokai, on March 7. Sightings of other adults in vicinity reported. This species previously found only on Oahu and Kauai. (Fujimoto, Miyahira).

CORRECTIONS

CEIR 19(11):182 - Paragraph 5, line 3: ONION THRIPS (Thrips fabaci) should read (Thrips *t*abaci).

INSECT DETECTION

New State Records

ANTS - ARKANSAS - *Aphaenogaster tennesseensis* collected in Crawford County May 16, 1968, by L.O. Warren. *A. texana texana* collected in Crittenden County March 3, 1955. *A. treatae pluteicornis* collected in Washington County April 30, 1968, by L.O. Warren and G. Wallis. *Smithistruma rostrata* collected in Washington County in October 1967 by R.M. Kirkton. All determined by E.P. Rouse. These are new State records. New county records are: *A. tennesseensis*, Madison and Washington; *A. texana texana*, Washington, Madison, Crawford, Craighead, Baxter, and Arkansas; *A. treatae pluteicornis*, Crawford, Madison, Craighead, Baxter, Nevada, and Polk. (Boyer).

APPLE RUST MITE (*Aculus schlechtendali*) - VERMONT - Collected on apple at Shoreham, Addison County. (p. 201).

A MEALYBUG (*Rhizoecus cacticans*) - WASHINGTON - Found in Whatcom County September 4, 1965. Determined by D.J. Williams. This is first published record of this mealybug in State. (p. 192).

A LEAFCUTTING BEE (*Megachile concinna*) - WASHINGTON - Found in trap nest of *Megachile rotundata* in 1968 in Yakima Valley. Determined by C.E. Bohart. (p. 193).

New County and Island Records

CLOVER HEAD WEEVIL (*Hypera meles*) - MISSOURI - Stone County. (p. 191).

ARMORED SCALES (*Ischnaspis longirostris*) and (*Gymnaspis aechmeae*) - FLORIDA - Osceola County. (p. 192).

ASIATIC OAK WEEVIL (*Cyrtepistomus castaneus*) - MISSOURI - Iron County. (p. 193).

A NOCTUID MOTH (*Phlegetonia delatrix*) - HAWAII - Molokai Island. (p. 194).

VAGRANT GRASSHOPPER (*Schistocerca vaga*) - HAWAII - Molokai Island. (p. 194).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville - 3/7-13, BL - Beet armyworm (*Spodoptera exigua*) 1, black cutworm (*Agrotis ipsilon*) 2, granulate cutworm (*Feltia subterranea*) 6. SOUTH CAROLINA - Charleston - 3/2-3/9, BL - Armyworm (*Pseudaletia unipuncta*) 1, black cutworm 3, variegated cutworm (*Peridroma saucia*) 2.

Weather of the week continued from page 190.
TEMPERATURE: A large dome of polar air covered much of the Nation early in the week. Subzero temperatures occurred in a dozen States - in the northern and central Rockies and eastward across the northern Great Plains to Upper Michigan. Freezing temperatures reached the Gulf of Mexico. This was the 12th consecutive cold week in Montana and the 5th consecutive cold week across the Deep South from Louisiana to Georgia. Afternoon temperatures generally remained in the 20's across the Central States and in the 40's, 50's and 60's across the South and in the Far West. Rapid warming occurred over the weekend, and temperatures reached the 50's and 60's from the central Great Plains to the middle Atlantic coast on Sunday. Almost the entire Nation averaged colder than normal. Parts of the Great Basin and the Great Plains averaged 12°-20° colder than normal. Maine averaged 3°-9° warmer than normal. (Summary supplied by Environmental Data Service, ESSA.)

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1968

(Continued from page 187)

DECIDUOUS FRUITS AND NUTS

Highlights:

CODLING MOTH infestations in Washington were the heaviest in 10 years. This pest was damaging to untreated fruit. ORIENTAL FRUIT MOTH was severe on peaches in Missouri. RED-BANDED LEAF ROLLER was heavier than usual in the fall in Virginia. LESSER PEACH TREE BORER and PEACH TREE BORER caused the most damage in 10 years in Florida and were the most destructive pests of stone fruit trees in Alabama. PEAR PSYLLA was heavier than usual in unsprayed orchards in Oregon and was generally less abundant than in 1967 in Washington. PLUM CURCULIO was serious on peach, plum, and apple in Alabama. APPLE MAGGOT was locally damaging to commercial apples in Indiana. EUROPEAN APPLE SAWFLY caused significant damage in a commercial orchard in New Hampshire for the first time. SPIDER MITE buildups were heavy in some areas. WALNUT CATERPILLAR damaged walnut and pecan in Kansas and walnuts in Iowa and Ohio. PECAN NUT CASEBEARER caused some loss to pecans in Alabama. HICKORY SHUCKWORM damage was heavy on pecans in Florida and Alabama. APHIDS damaged nut crops in some areas and required controls. PECAN WEEVIL was damaging in Alabama and was heavy in areas of Texas.

CODLING MOTH (*Carpocapsa pomonella*) larvae infested apples throughout MONTANA. The infestation in WASHINGTON was the heaviest recorded for the last 10 years. The reduced spraying, resulting from a smaller apple crop, may have accounted for some of this increased infestation. In north-central OREGON female-baited traps placed in 23 commercial orchards in Hood River and Wasco Counties caught 669 males in 947 trap-nights. Individual night catches ranged up to 71. In Umatilla County third-generation adults peaked in late August with up to 51 males per night in traps. Numbers varied considerably over CALIFORNIA. Codling moth populations in UTAH were slightly higher than normal during 1968 than during 1967. Many unsprayed apples were 100 percent infested. Possibly because of well-timed sprays, the percentage of infested apples in NEW MEXICO was much lower than in previous years in the Hondo Valley. Losses were very high in apple orchards in San Juan and De Baca Counties. At least 70 percent of the apples checked in De Baca County were infested. Larvae damaged fruits in TEXAS.

Codling moth damage in MISSOURI was very light in sprayed apple orchards; late June infestations were severe on unsprayed fruit in the southeastern and central areas. Moth catches in WISCONSIN were regular but low, except for a mild peak the first week of August. Larvae damaged only 0.13 percent of the apples in 33 well-kept ILLINOIS orchards. Larvae in INDIANA were 0.5 inch long at Vincennes, Knox County, by mid-May. Prepupae began leaving fruit about June 18, as the last overwintered moths were emerging. The second flight began the first week of July. New entries were found a week later. In the last week of August the third flight peaked and then ceased October 7. Damaged apples ranged 85-95 percent in unsprayed trees and was below 0.05 percent in well-kept commercial orchards. By late June codling moth larvae in OHIO had damaged apples and had begun leaving fruit to begin pupation. In mid-July the first-generation adults began emerging. Larvae were light even in unsprayed orchards in RHODE ISLAND. In VIRGINIA codling moth was well controlled until preharvest when control was discontinued. Infestations in commercial orchards were very low in MARYLAND.

ORIENTAL FRUIT MOTH (*Grapholitha molesta*) caused local damage in several CALIFORNIA counties. Feeding mainly on peach terminals but not on fruit, larvae caused no loss in 1968 in COLORADO. Larvae caused occasional damage in OKLAHOMA and damaged fruits in TEXAS. Oriental fruit moth was severe on peaches in the delta area of MISSOURI by mid-May. By late May populations were moderate in several orchards in the south-central and central areas. Numbers were very light for the rest of the season. Flights in INDIANA peaked May 2, June 14, July 22, and September 8 at Vincennes, Knox County. Extending from August 7 to October 1, the last flight may have been composed of the third and fourth generations. A few late entries at harvest were reported by one commercial grower. Twig injury and infested peaches increased in CONNECTICUT in 1968.

RED-BANDED LEAF ROLLER (Argyrotaenia velutinana) was normally light early in the season in VIRGINIA. However, early instars were heavier than usual on apples in September and October and on peaches where infestation levels reached 18 percent. Overwintered adults peaked April 9-15 in the Vincennes area of Knox County, INDIANA. Summer broods peaked in mid-June, early August, and late September. Last males were caught the week of October 22-28. Damage was 24 percent in an unsprayed orchard and less than 1 percent on commercial apples. Red-banded leaf roller was very light and occurred in very few orchards in MISSOURI. ORANGE TORTRIX (Argyrotaenia citrana) larvae in OREGON damaged much apple fruit near Salem, Marion County, for an unusual occurrence.

FRUIT-TREE LEAF ROLLER (Archips argyrospilus) larvae were heavy on chokecherry and apple trees in Weston County, WYOMING, in mid-June. A few reports were received from other areas. Infestations occurred in a few local CALIFORNIA areas. Fruit-tree leaf roller populations were high, especially on poorly or late sprayed trees in CONNECTICUT.

LESSER PEACH TREE BORER (Synanthedon pictipes) larvae were more destructive than PEACH TREE BORER (Sanninoidea exitiosa) in FLORIDA. Many growers had the greatest damage in 10 years. Poorly timed sprays were partly responsible. Lesser peach tree borer and peach tree borer were the most destructive pests of peach, plum, and cherry throughout ALABAMA. In Lower MICHIGAN lesser peach tree borer outbreaks occurred in Grand Traverse County on tart cherries because of tree injury by mechanical harvesters. Broods of lesser peach tree borer in INDIANA peaked in early June and late August at Vincennes, Knox County. One or more larvae infested an average of 80 percent of 7-year-old peach trees in several commercial orchards. Losses were moderate. Peach tree borer larvae damaged less than 1 percent of 3,600 commercial peach trees examined in the same area of Indiana. Lesser peach tree borer was the main peach insect in ILLINOIS. Peach tree borer caused occasional damage in OKLAHOMA. Peach tree borer larvae infested many stone-fruit trees in UTAH. Light to heavy larval populations of an AEGERIID MOTH (Sanninoidea sp.) infested peach trees in 2 west-central counties of NEW MEXICO. Infestations were especially serious in untreated orchards.

AMERICAN PLUM BORER (Euzophera semifuneralis) damaged deciduous fruit trees in a few CALIFORNIA locations. Larvae damaged fruits in TEXAS. American plum borer larvae averaged 1.6 per infested tree in a 1.7-percent infestation of a 60-acre commerical peach orchard in the Vincennes area of Knox County, INDIANA.

FALL WEBWORM (Hyphantria cunea) damaged fruits in TEXAS. Webs and defoliation became noticeable throughout TENNESSEE during August. Defoliation was heavy on persimmon and cherry, especially in the central and in some western areas. In INDIANA all trees in an unsprayed 5-acre apple orchard at Vincennes, Knox County, had one or more second-brood fall webworm webs in September.

PEACH TWIG BORER (Anarsia lineatella) was generally heavy in CALIFORNIA. In COLORADO peach twig borer was the most destructive peach insect. Because few controls were applied in 1966 and 1967, populations built up to the damaging levels of 1968.

EASTERN TENT CATERPILLAR (Malacosoma americanum) damaged fruits in TEXAS, and larvae caused occasional damage in OKLAHOMA. Hatching and larval feeding in INDIANA occurred the first week of April at Vincennes, Knox County. Nests were conspicuous by mid-April and were being abandoned by full-grown larvae by May 4.

PEAR PSYLLA (Psylla pyricola) caused more damage than normal to pears in northern CALIFORNIA. Populations in OREGON were the heaviest in recent years in untreated orchards in Hood River and Lane Counties. During mid-February and early March overwintered adults were active in Jackson County and the Willamette Valley. In mid-March hatch began in Hood River County. About mid-May second-generation adults appeared in Jackson County. During late May and early June an average of 500-600 eggs and 5 nymphs per 25 leaves were found in untreated orchards. A mid-July buildup began in Jackson County in orchards treated in February. In late August adults of the last summer generation were heavily infesting and laying eggs in untreated orchards in Hood River County. Populations were average in sprayed orchards. Although generally less abundant in WASHINGTON in March 1968 than in 1967, heavy flights of 2 to 5 per minute in traps occurred at Yakima, Yakima County, February 29. Of 93 specimens examined, 47 percent were males; this is the heaviest flight to date recorded at Yakima. By November, 90 percent of a population sample were overwintering forms. Counts in upper and lower Yakima Valley pear orchards were very high. The highest count in February was 400, but counts on October 23 ranged 300-3,000. Pear psylla buildups on pears in MICHIGAN were heavy because controls were ineffective. Numbers in PENNSYLVANIA were moderately severe on all unsprayed trees. Many unsprayed trees were black from sooty fungus and almost completely defoliated in mid-August. Numbers increased throughout CONNECTICUT; they were very abundant in backyard pear trees. Pear psylla was widespread on pear in RHODE ISLAND after mid-July.

APPLE APHID (*Aphis pomi*) was at a high level in NEW HAMPSHIRE. Colonies persisted well into August. Heavy populations were found on sucker growth of apples in late July and on flowering crab apple in mid-August in RHODE ISLAND. Apple aphid was lower than normal in VIRGINIA. Existing spray programs were effective. Eggs in OHIO had hatched, and colony size had begun to increase on apple foliage by the end of April. By late June and early July up to 300 aphids per leaf infested some unsprayed apple foliage in the northeastern area. The first colony in INDIANA was found on soft terminal growth in early May at Vincennes, Knox County. Alates were found during the fourth week of May. Numbers in commercial orchards were low. Apple aphid was light on apples early in the season in MISSOURI. A light to moderate infestation was reported in one orchard in mid-June. Dormant and delayed sprays controlled light to moderate populations in COLORADO apple-growing areas. Predators in untreated orchards were effective. Apple aphid numbers in UTAH were up compared with 1967, and this pest was one of the major species infesting fruit crops in CALIFORNIA.

ROSY APPLE APHID (*Dysaphis plantaginea*) in VIRGINIA was slightly more prevalent than in 1967 but was adequately controlled with the existing spray program. Curled leaves in OHIO were first reported the last week of April. Up to 100 aphids per curled leaf remained on unsprayed apples through June. During the last week of April in INDIANA, rosy apple aphid colonies were found at Vincennes, Knox County, and were conspicuous May 7-13 with alates dispersing. Fruit damage ranged 6-8 percent in one unsprayed orchard checked at harvest; commercial damage was low. Light apple aphid infestations occurred in many MISSOURI apple orchards. Dormant and delayed sprays controlled light to moderate populations in COLORADO apple-growing areas. Predators were effective in untreated orchards. Rosy apple aphid populations decreased in UTAH when compared with 1967, but this pest was one of the major species infesting fruit crops in CALIFORNIA.

APPLE GRAIN APHID (*Rhopalosiphum fitchii*) began to hatch in southern OHIO the first week of April, but the relatively low population caused no damage. Eggs hatched March 18 at Vincennes, INDIANA. By April 8, females deposited live nymphs. During the first half of May alates left the trees. Dormant and delayed sprays controlled the light to moderate apple grain aphid populations in apple-growing areas of COLORADO. Predators were effective in untreated orchards.

WOOLLY APPLE APHID (*Eriosoma lanigerum*) lightly infested pears in RHODE ISLAND during the last week of July. In ALABAMA it was again the major pest of apples, infesting root systems above and below ground level. Populations in UTAH were normal in 1968 compared with 1967. Woolly apple aphid was one of the the major species infesting fruit crops in CALIFORNIA.

GREEN PEACH APHID (*Myzus persicae*) and BLACK CHERRY APHID (*M. cerasi*) were 2 of the major species infesting fruit in CALIFORNIA. Green peach aphid caused normal to below normal curling of peach foliage during spring in UTAH. Black cherry aphid infested cherry in RHODE ISLAND in late May.

SAN JOSE SCALE (*Aspidiotus perniciosus*) produced color rings on developing apples in INDIANA at Vincennes, Knox County. The rings were first noted June 11-17. Only poorly maintained orchards had fruit and tree injury from large populations. In central and northern ALABAMA San Jose scale continued to be the most important scale insect affecting peach, apple, plum, and pear. It damaged fruits in TEXAS. This scale damaged trees at many homes and in some commercial orchards in UTAH. In CALIFORNIA general infestations of San Jose scale were heavy, and FORBES SCALE (*A. forbesi*) was heavy on 50 acres of quince in Sacramento County.

WHITE PEACH SCALE (*Pseudaulacaspis pentagona*) damage in FLORIDA was much less in 1968 than in 1967 partly because of winter oil sprays and precision timing of summer sprays. Even in untreated orchards, numbers were lighter than usual. Extremely dry weather could have affected buildup. Infested nursery stock and resultant quarantines have discouraged several nursery owners from stocking peach trees. In southern and central ALABAMA white peach scale has become the more important scale on peach and plum and on several nonfruit hosts. OYSTER-SHELL SCALE (*Lepidosaphes ulmi*) crawlers in OREGON were feeding and damaging cherry fruits at Cove, Union County, in early August. In MONTANA it infested fruit trees in many scattered locations and damaged a few other trees and shrubs.

PRUNE LEAFHOPPER (*Edwardsiana prunicola*) and APPLE LEAFHOPPER (*Empoasca maligna*) discolored some foliage in UTAH. Apple leafhopper damaged some developing terminals on young trees in commercial orchards in the Vincennes area of Knox County, INDIANA. Heavy leafhopper populations, mostly *Erythroneura obliqua* and *E. lawsoniana*, caused considerable leaf stippling and terminal distortion in apple orchards in Indiana. WHITE APPLE LEAFHOPPER (*Typhlocyba pomaria*) outbreaks in MICHIGAN were severe in late August and September on plums and apples in Berrien and Van Buren Counties. *Empoasca* sp. was abundant in CONNECTICUT and damaging where sprays were inadequate.

PLUM CURCULIO (*Conotrachelus nenuphar*) damage in FLORIDA was at a minimum partly because of well-timed sprays. Statewide in ALABAMA, plum curculio was the most serious pest of peach, plum, and apple fruit. It damaged fruits in TEXAS. Populations in MISSOURI were light on treated apples but severe by early July on unsprayed trees. Early in the season plum curculio was light on peaches but by early July was medium in the southern and southeastern areas of Missouri. Egg scars on small apple fruit in INDIANA were first noted in late May and early June at Vincennes, Knox County. The majority of early variety apples in one orchard had egg scars at fruit maturity. One thousand unsprayed Lodi apples yielded 1,200 prepupae, and most unsprayed peaches were infested at harvest in another orchard. Spring emergence of plum curculio was heavier than usual in CONNECTICUT. Some increase in damage activity lasted later than usual. Scattered plum curculio adults occurred by June 25 in RHODE ISLAND. In NEW HAMPSHIRE the first plum curculio adult was taken on May 15. Unfavorable weather prevailed during the oviposition period. Damage was at a low level in commercial orchards.

PACIFIC FLATHEADED BORER (*Chrysobothris mali*) was severe again in CALIFORNIA in 1968. In WASHINGTON this pest was found feeding in the large brace roots of 3 to 4-year-old cherry trees at White Salmon, Klickitat County, September 13; it damaged or killed about 50 trees. SCARABS (*Pleocoma* spp.) did not emerge as early as expected in OREGON because of unusually high rainfall in August. The first *Pleocoma* adults, which were collected September 18, were females of *P. minor*; very few males were taken in light traps. First captured the third week of October, *P. crinita* appeared to be in peak flight in mid-November. The above records are for the Hood River Valley, Hood River County. At The Dalles, Wasco County, *P. oregonensis* peaked the first part of October.

SHOT-HOLE BORER (*Scolytus rugulosus*) was more prevalent than in other years in CALIFORNIA. Overwintered adults of *S. rugulosus* in WASHINGTON were recovered from duff under trees about March 1. Numbers were more abundant than usual on stone fruits in Chelan County. A specimen of APPLE TWIG BORER (*Amphicerus bicaudatus*) in OREGON was found in a blacklight trap on one of the Portland docks for the first report west of the Rocky Mountains. TWIG GIRDLER (*Oncideres cingulata*) in KANSAS was less numerous in 1968 than usual. Many larvae and pupae of BROAD-NECKED ROOT BORER (*Prionus laticollis*) in RHODE ISLAND were excavated from around the trunks and roots of apple trees in late June.

APPLE MAGGOT (*Rhagoletis pomonella*) was a pest in IOWA. Flies were caught on stickyboards in the Vincennes area of Knox County, INDIANA, from June 10 until October 26. Adults of the first brood peaked July 2, and the partial second generation of adults peaked in mid-September. A sample of 1,000 unprayed Lodi apples from an abandoned orchard produced 1,179 prepupae at harvest. Damage occurred in local commercial orchards. The first apple maggot adults of the season were collected in northeastern OHIO on June 20. In late July larvae began to emerge from summer apples. Larvae in PENNSYLVANIA continued as the major pest of backyard apple trees. Timely sprays held numbers to a low level in commercial orchards. Late season activity in CONNECTICUT was heavy in commercial and backyard trees; more fruit was infested. Females in RHODE ISLAND laid eggs in late July; little damage occurred in commercial orchards.

A CHERRY FRUIT FLY (*Rhagoletis indifferens*) caused much economic loss in OREGON where spray programs were lax. First adult emergence was noted in late May and early June in Jackson, Marion, and Umatilla Counties. Most cherry orchards in the Flathead Lake area and the Bitterroot Valley of MONTANA were treated for *R. indifferens*. BLACK CHERRY FRUIT FLY (*R. fausta*) adults were collected in Door County, WISCONSIN, beginning June 7 and occurred throughout the county. Late in July full-grown larvae were heavy in untreated cherry orchards in Door County. In August adult catches declined.

PEAR-SLUG (*Caliroa cerasi*) was very low in Jackson County, OREGON, although numbers are normally abundant in this area. Much parasitism was noted. Pear-slug larvae in MONTANA infested ornamental plums, cotoneaster, and backyard fruit trees. Pear-slug infested fruit trees at several locations in Ravalli, Lake, Gallatin, Musselshell, Carbon, and Yellowstone Counties, Montana. Pear-slug was a pest in IOWA. EUROPEAN APPLE SAWFLY (*Hoplocampa testudinea*) in NEW HAMPSHIRE caused a significant amount of damage for the first time in a commercial orchard. European apple sawfly injury occurred in 2 orchards in VERMONT. The number of reports are increasing. Damage is as yet insignificant. Numbers on apples were above normal.

EUROPEAN RED MITE (*Panonychus ulmi*) started to build up in NEW HAMPSHIRE in late July after 4-6 weeks of dry weather. This mite was absent from VERMONT orchards. All stages of European red mite infested sprayed and unsprayed orchards throughout the growing season in RHODE ISLAND. Developing late in the season, infestations in central MARYLAND caused moderate damage in commercial orchards. Recommended controls were not effective in several orchards. Populations of European red mite and other mites in VIRGINIA were generally lighter than in 1967. Very few serious problems involved fruit loss. Hatch of overwintering European red mite eggs in most OHIO areas was nearly completed by the second week of May. During July some buildup occurred. By the third week of August bronzed apple foliage, and up to 30 mites per leaf were reported. Unfavorable weather generally kept numbers lighter than normal during the season.

Most overwintering eggs of European red mite in INDIANA had hatched at Vincennes, Knox County, by April 22. Hot, humid weather in the southern districts favored heavy buildups on apples. Miticides were applied in mid-June when counts reached 25 motile forms per leaf. Late July counts averaged 43 immatures and 31 adults per leaf in Knox County. September counts declined naturally while overwintering eggs were laid. This was the major apple pest in southern Indiana. In MICHIGAN hot, humid weather caused outbreaks on apples, prunes, peaches, and cherries.

European red mite was a pest in many IOWA orchards. Populations on apples and peaches in MISSOURI were light from early April until late June, then moderate to severe in some orchards, and finally declining by late July. Numbers on apples in COLORADO were not so abundant as in 1967 and 1966. This pest was controlled by miticides. European red mite counts in UTAH were above normal. The greatest amount of damage occurred in Utah County. This mite was prevalent throughout the growing season in CALIFORNIA.

TWO-SPOTTED SPIDER MITE (Tetranychus urticae) occurred infrequently and in very low numbers throughout the growing season in RHODE ISLAND. Miticides easily controlled heavy numbers in FLORIDA. Unnecessary and poorly timed applications seemed to aggravate the situation in many cases. Sprays on apples in COLORADO had to be applied 2-3 times to control two-spotted spider mite populations of 30-50 per leaf. Indirect loss of apples was estimated at 1-3 percent. Miticides added to cover sprays on pears gave good control. Normal cover sprays on peaches controlled the light to moderate numbers.

A SPIDER MITE (Tetranychus mcdanieli) caused much damage in one central and 5 northwestern counties of NEW MEXICO. A complex of T. mcdanieli and two-spotted spider mite in UTAH was common and damaging. Populations developed, damaged, and remained on the trees later than normal. Dominant in many orchards during 1967, two-spotted spider mite was seldom dominant this season. T. mcdanieli infestations ranged up to 200 per leaf in parts of some integrated orchard blocks of Canyon County, IDAHO, by early August. Typhlodromus spp. (phytoseiid mites) ranged 0-5 per leaf.

Nymphs of a SPIDER MITE (Tetranychus sp.) were first found in INDIANA in an apple leaf sample at Vincennes, Knox County, on May 1. Numbers in most orchards were low probably because of the good quality of the ground cover. One commercial orchard on sandy soil was heavily infested in midseason. Tetranychus sp. in MISSOURI ranged light to moderate on apples until mid-July; a few reports of high numbers occurred in late July and early August. In OREGON overwintering forms of Tetranychus spp. were active by mid-March in Hood River and Wasco Counties. Mid-August counts on most tree fruits were heavy. Predaceous mites and much moist, cool weather kept the spider mite problem lower than usual. A FRUIT-TREE MITE (Bryobia rubrioculus) was low for the fourth successive year in UTAH. Bryobia rubrioculus ranged light to moderate on peaches in COLORADO. Normal cover sprays gave good control.

APPLE RUST MITE (Aculus schlechtendali) was collected from apple at Shoreham, VERMONT, for a new State record. A. schlechtendali was heavy in unsprayed apple trees in an orchard at Vincennes, Knox County, INDIANA, in June. PEACH SILVER MITE (A. cornutus) ranged light to moderate on peaches in COLORADO. Normal cover sprays gave good control. PEAR RUST MITE (Epitrimerus pyri) on pears in Colorado was not so abundant as in the past 2 years; early sprays gave good control. PEAR LEAF BLISTER MITE (Eriophyes pyri) infested many pear and apple trees in western MONTANA.

Several pests were of some concern on nut crops in 1968. WALNUT CATERPILLAR (Datana integerrima) damaged nuts in TEXAS, and was damaging in scattered areas of OKLAHOMA from early July to mid-October. Larvae defoliated many walnut and pecan trees throughout eastern KANSAS. Walnut caterpillar populations ranged light to moderate on walnut in eastern, southeastern, and northeastern NEBRASKA in August and September. Colonies averaged one or more per tree in most areas. Larvae defoliated many black walnut trees in IOWA. Hatch in OHIO was first reported in June. During July larval populations became established primarily on walnut, but also on hickory. By mid-August defoliated walnut trees were common. Walnut trees were severely defoliated through much of the State except possibly in the southeastern area. Widespread damage to walnut and hickory continued through most of August. In early September most larvae had completed feeding. PECAN NUT CASEBEARER (Acrobasis caryae) moths from the overwintering generation in FLORIDA appeared about May 1. Damage was severe in untreated pecan orchards near Monticello, Jefferson County. Many growers lost at least half of their crop.

A light second generation caused practically no economic damage. Heavy first and second generations of pecan nut casebearer caused some pecan losses in central and southern ALABAMA. Infestations in TEXAS were reported from the south-central and Rolling Plains areas. Pecan nut casebearer eggs were first found in southwestern and south-central OKLAHOMA in early June. Heavy numbers infested scattered areas by late June. Second-generation egg laying began in early August. Larvae of pecan nut casebearer damaged nuts on untreated trees in the Carlsbad area of Eddy County, NEW MEXICO. Larvae were found in nuts in the Artesia area of this county for the first time during the summer of 1968. NAVEL ORANGEWORM (*Paramyelois transitella*) infestations in almonds and walnuts were normal in CALIFORNIA.

HICKORY SHUCKWORM (*Laspeyresia caryana*) moth emergence peaked in FLORIDA April 4 to 11, 1-2 weeks before the first pecan nuts appeared near Monticello, Jefferson County. Most second-generation larvae occurred on hickory. In the second week of July moths were first seen in numbers about pecans. Third-generation larvae apparently caused a heavy July drop of pecan nuts. A very heavy fifth generation in late September and early October was followed by a very light sixth generation in late November. Overall damage was heavy. Hickory shuckworm was again the major pest of pecans in ALABAMA. Serious losses resulted from the lower yield and poorer quality. This pest was damaging in OKLAHOMA during October and November, and larvae damaged nuts in TEXAS.

In OREGON, FILBERTWORM (*Melissopus latiferreanus*) adults emerged July 9 in a test orchard near Eugene, Lane County, and reached a peak during the first few days of August. FALL WEBWORM (*Hyphantria cunea*) was heavy on walnuts in Butte County, CALIFORNIA. Larvae ranged medium to heavy in most areas of OKLAHOMA from mid-June to early September.

APHIDS (*Monellia* spp.) were lighter than usual in FLORIDA, but *Myzocallis* spp. were heavy in many cases. Near Monticello, Jefferson County, sooty mold as a result of *Monellia* spp. infestations caused early defoliation of neglected pecans. *Myzocallis* spp., however, appeared too late to cause serious damage. BLACK PECAN APHID (*Myzocallis caryaefoliae*), BLACK-MARGINED APHID (*Monellia costalis*), and *Monelliopsis nigropunctata* were serious pests of pecans in southern and central ALABAMA, but aphids were generally less important than in most years. Black-margined aphid caused occasional damage in OKLAHOMA, but this aphid and black pecan aphid required treatment in most pecan orchards in NEW MEXICO. FILBERT APHID (*Myzocallis coryli*) in northern UTAH was extremely numerous in some plantings during spring and fall. WALNUT APHID (*Chromaphis juglandicola*) heavily infested English walnut trees at times in Washington, Utah, and Weber Counties, UTAH. Slightly above normal infestations over most of the State made black walnut foliage moderately to extremely sticky. Walnut aphid and black-margined aphid were the major species infesting nut crops in CALIFORNIA. PHYLLOXERAS (*Phylloxera* spp.) appeared in mid-May in OKLAHOMA and were heavy in many areas by early June.

PECAN WEEVIL (*Curculio caryae*) caused localized damage as usual in FLORIDA, but was severe in parts of a few pecan groves in the vicinity of Monticello, Jefferson County. Egg oviposition apparently occurred in early July. Larvae left the nuts in October. Counts of 12 larvae per square yard in soil were not uncommon in November. Pecan weevil has become more widespread and damaging in ALABAMA. Infestations occurred farther south than usual in Covington, Clarke, Monroe, and other southern counties. Emergence of pecan weevil began in late August in OKLAHOMA. Damage ranged as high as 90 percent on the very small pecan crop in Mayes County. Light to heavy populations occurred in many of the pecan-growing regions of TEXAS. Infestations were again heavy in Kimble, Menard, and Comanche Counties.

WALNUT HUSK FLY (*Rhagoletis completa*) was detected for the first time in Clackamas and Yamhill Counties, OREGON, during 1968. The first adults were collected at The Dalles, Wasco County, the last week of June. In past years, emergence began during the last half of July. Adults began to emerge in Jackson

County the week of July 26, and the first catch of the season in Portland was August 1. In The Dalles emergence peaked during the first week of August and again in the first week of September. This can probably be correlated with an unusually cool, wet August which suppressed most insect activity. Populations appeared to be higher in The Dalles and are still increasing in Jackson County. Lighter numbers were reported in Douglas County. Walnut husk fly was widespread and very damaging in CALIFORNIA. Populations ranged moderate to very numerous in UTAH. Larvae infested more English walnuts than black walnuts from Utah County northward.

PACIFIC SPIDER MITE (*Tetranychus pacificus*) infested almonds, and a FRUIT-TREE MITE (*Bryobia rubrioculus*) was heavy on this crop in CALIFORNIA. PECAN LEAFROLL MITE (*Aceria caryae*) caused occasional damage in OKLAHOMA. Unspecified MITES were abundant in several pecan groves in FLORIDA, especially late in the year, but damage was not severe.

CITRUS

Highlights:

An ARMORED SCALE occurred in 16 percent of the survey groves in Florida. This is the highest number on record and indicates potential problems in the State. Infestations of several other SCALE INSECTS were at low levels in Florida. CALIFORNIA RED SCALE was unusually prevalent and difficult to control in California. MEALYBUGS and WHITEFLIES were generally normal on Florida citrus. Larvae of LEAF ROLLER MOTHS were problems in California and Arizona. CITRUS RED MITE was severe in California citrus areas and was heavy on grapefruit and lemons in Arizona.

BLACK SCALE (*Saissetia oleae*) was above normal from January to March in FLORIDA but was important only in 2-5 percent of the groves. Numbers increased rapidly from a very low level at mid-May to a record high for June. In June 93 percent of the groves were infested, and 50 percent had heavy infestations. Black scale continued at a very high level through July, gradually decreased to a low level by late September, and was in the normal low range in the fall. PYRIFORM SCALE (*Protopulvinaria pyriformis*) and BROWN SOFT SCALE (*Coccus hesperidum*) were at the lowest levels for November in 18 years in Florida. In ARIZONA brown soft scale heavily infested a 100-acre grove at Goodyear, Maricopa County, in June. In early December a moderate infestation was found at Somerton, Yuma County. CITRICOLA SCALE (*C. pseudomagnoliarum*) heavily infested trees at Glendale, Goodyear, and Litchfield in Maricopa County, Arizona, from April through June. In CALIFORNIA citricola scale was much lower than in 1967, but black scale was higher apparently because of lower parasite activity.

The following armored scales were reported from FLORIDA. *Unaspis citri* was recorded from 16 percent of the survey groves, the highest percentage on record. This indicates future problems. Populations generally did not increase to above normal levels until the second half of 1968 when a record high was reached for November. This scale continued to be a problem for citrus nursery owners because of difficulty with controls and the need to quarantine infested stock. FLORIDA RED SCALE (*Chrysomphalus aonidum*) was at the lowest November levels in 18 years. PURPLE SCALE (*Lepidosaphes beckii*) was the lowest for June in 17 years and the lowest for November and December in 18 years of record. GLOVER SCALE (*L. gloverii*), CHAFF SCALE (*Parlatoria pergandii*), and YELLOW SCALE (*Aonidiella citrina*) were below normal during 1968 in Florida.

CALIFORNIA RED SCALE (*Aonidiella aurantii*) was unusually prevalent and difficult to control in CALIFORNIA. Locally heavy damage occurred. Parasite and/or predator activity were reduced or absent.

COTTONY-CUSHION SCALE (Icerya purchasi) was at the lowest November levels in 18 years in FLORIDA. MEALYBUGS and WHITEFLIES generally followed the norms established from previous records. APHIDS in Florida citrus groves were scarce in winter due to weather, and populations were the lowest on record for March. In spring aphids were much below normal due to the late appearance and rapid hardening of the spring flush.

The following Lepidoptera were troublesome. A TORTRICID MOTH (Ptycholoma peritana) infested citrus in Tulare County, CALIFORNIA. Platynota stultana was severe on 10,000 acres in Kern, Tulare, and Fresno Counties in December. In ARIZONA P. stultana required controls in nurseries at Yuma, Yuma County, from mid-July through October, and ORANGE-DOG (Papilio cresphontes) was a problem on many trees during September and October, especially young trees in Maricopa and Yuma Counties. In FLORIDA orange-dog became very prevalent on limes in the Homestead area of Dade County.

CITRUS THRIPS (Scirtothrips citri) was lower but more widespread in CALIFORNIA. Nymphs began appearing in the Salt River Valley of ARIZONA during early March. By late March prebloom treatment had been made in most groves. Postbloom treatments were applied in mid-April. In September populations built up heavily, especially on young trees. Ripe fruit showed little damage in early December. In Yuma County nymphs appeared at Yuma in mid-February, and adults were active from mid-March through September in nurseries. Periodic treatments were required in nurseries.

FORK-TAILED BUSH KATYDID (Scudderia furcata) was damaging in Riverside and San Bernardino Counties, CALIFORNIA. In ARIZONA fork-tailed bush katydid and S. mexicana caused heavy feeding injury on the rinds of ripe navel oranges. Damage was especially heavy in groves on the east side of the Salt River Valley in Maricopa County. In late February viable eggs were heavy on leaf edges and stems at Mesa. Numbers were heavy at Chandler Heights and East Mesa in mid-April. By early May these katydids were feeding heavily on young fruit.

CITRUS RED MITE (Panonychus citri) was severe and is now a problem in practically all citrus areas in CALIFORNIA. In ARIZONA citrus red mite was heavy in grapefruit and lemon blocks at Yuma, Yuma County, from February through April, spotty from May through September, and heavy in October through early December. Treatments were made to prevent fruit scarring. In FLORIDA citrus red mite was the lowest for June in 17 years of record. A peak in July was slightly higher than the moderate level of May. Only 33 percent of the groves harbored economic numbers. Populations remained below normal overall and decreased to the lowest level for September and November in 18 years of record.

TEXAS CITRUS MITE (Eutetranychus banksi) was much above the normal winter abundance in FLORIDA until late March, when it then decreased to normal. About 5 percent of the groves in scattered locations had heavy infestations. From April to June this mite was at moderate levels. Populations held the normal high level through July when 54 percent of the groves had economic infestations and then rapidly decreased in August to the lowest September level since 1955.

CITRUS FLAT MITE (Brevipalpus lewisi) scarred fruit in ARIZONA at Yuma, Yuma County, from July through September. This mite was found in the Wellton citrus area in early October; repeated treatments were made. Light numbers infested the fall flush of growth at Deer Valley and Rainbow Valley during early November in Maricopa County. Citrus flat mite populations were medium in Butte, San Bernardino, and Tulare Counties, CALIFORNIA.

CITRUS RUST MITE (Phyllocoptruta oleivora) was the heaviest in 17 years of record from January through March in FLORIDA. At the January peak, infestations were heavy in 49 percent of the groves and important in all districts. April to mid-September populations continued above normal; a majority of the groves had economic infestations. Near mid-September a brief decrease to normal levels was followed by the fall uptrend. At mid-November frosty weather started a downward trend. CITRUS BUD MITE (*Aceria sheldoni*) was general in coastal Santa Barbara and Ventura Counties, CALIFORNIA.

OTHER TROPICAL AND SUBTROPICAL FRUIT

OLIVE SCALE (*Parlatoria oleae*) was heavy on olive in Madera, Tulare, Fresno, and Yolo Counties, and BLACK SCALE (*Saissetia oleae*) infested olive trees locally; both were in CALIFORNIA. FIG SCALE (*Lepidosaphes ficus*) showed some buildup in Fresno County.

A SEED CHALCID (*Megastigmus pistaciae*) did not spread in Butte County, CALIFORNIA, due to suppression treatment. A JUNE BEETLE (*Cotinis texana*) damaged ripening figs in San Bernardino and San Diego Counties, California. Larvae of a GRACILLARIID MOTH (*Gracillaria perseae*) were more abundant on avocado in the Homestead area of FLORIDA than for several years. AVOCADO RED MITE (*Oligonychus yothersi*) was generally not abundant enough on avocados in Florida to warrant control measures.

SMALL FRUITS

Highlights:

WESTERN GRAPE LEAF SKELETONIZER was damaging in the Salt River Valley of Arizona. STRAWBERRY CROWN MOTH larvae damaged strawberries in Washington and Oregon. CRANBERRY FRUITWORM was severe on blueberries in New Hampshire. STRAWBERRY APHID was unusually numerous in the Willamette Valley of Oregon. MITES were of some concern in a few areas.

WESTERN GRAPE LEAF SKELETONIZER (*Harrisina brillians*) adults appeared in mid-April in NEVADA, about a month early, and developed heavy populations in the Las Vegas area of Clark County. This pest was found in Boulder City, Clark County, for the first time. Larvae caused very light damage to vineyards in the "Dixie" area of Washington County, UTAH. Eggs were laid from mid-May through September in ARIZONA. Adults were numerous in June, and larvae in July. Larvae damaged many vines in the Salt River Valley of Maricopa County.

STRAWBERRY CROWN MOTH (*Ramosia bibionipennis*) larvae heavily damaged some strawberry fields in Washington and Malheur Counties, OREGON, and severely girdled roots and stunted many young strawberry plants in a 5-acre field in Clark County, WASHINGTON, in April. RASPBERRY CROWN BORER (*Bembecia marginata*) infested raspberries in most of western MONTANA. Larvae of GRAPE BERRY MOTH (*Paralobesia viteana*) conspicuously damaged vineyards in the "Dixie" area of Washington County, UTAH.

CRANBERRY FRUITWORM (*Acrobasis vaccinii*) severely damaged some highbush blueberry plantings in NEW HAMPSHIRE. Larvae infested up to 25 percent of the clusters. Larvae of GRAPE PLUME MOTH (*Pterophorus periscelidactylus*) infested grape leaves June 13 in RHODE ISLAND and tips in most plantings in CONNECTICUT.

WESTERN RASPBERRY FRUITWORM (*Byturus bakeri*) adults were common on flowers of western thimbleberry in Multnomah County, OREGON, during June. This fruitworm beetle was not reported on cane fruits in Oregon but infested raspberry plantings at Arlee in Lake County, MONTANA. EASTERN RASPBERRY FRUITWORM (*B. rubi*) adults were active by May 16 in RHODE ISLAND. This species was more common than usual in NEW HAMPSHIRE.

A WEEVIL (*Sciopithes obscurus*) was a contaminant of cane berries in the northern Willamette Valley of OREGON. Larvae of another weevil (*Peritelinus oregonus*) heavily damaged at least 50 acres of strawberries in the Parkdale area of Klickitat County, WASHINGTON, in July. STRAWBERRY ROOT WEEVIL (*Brachyrhinus ovatus*), *B. rugosostriatus*, and BLACK VINE WEEVIL (*B. sulcatus*) damaged strawberry, raspberry, and other susceptible plants in UTAH. Strawberry root weevil and *Brachyrhinus rugosostriatus* were numerous in canyons and farm areas. Egg laying injury by another WEEVIL (*Ampeloglypter ater*) was widespread in New Haven County, CONNECTICUT.

A FLEA BEETLE (*Altica ignita*) heavily infested some varieties of strawberries in mid-September in ARKANSAS. In NEW HAMPSHIRE moderate to heavy feeding by *Altica sylvia* caused some defoliation in several acres of lowbush blueberries. RASPBERRY CANE BORER (*Oberea bimaculata*) populations were above average in New Hampshire.

STRAWBERRY APHID (*Chaetosiphon fragaefolii*) was unusually prevalent in the Willamette Valley of OREGON, where large numbers persisted until late in the season. Strawberry aphid averaged 2 per strawberry leaf by March 1 at Vancouver in Clark County, WASHINGTON. This is a higher than usual count for this time of year.

LEAFHOPPERS (*Erythroneura* spp.) were widespread and heavy on grapevines in CALIFORNIA. VIRGINIA-CREEPER LEAFHOPPER (*Erythroneura ziczac*) was plentiful and persistent on grapevines in Garfield County, MONTANA. Virginia-creeper leafhopper and ROSE LEAFHOPPER (*Edwardsiana rosae*) discolored much grape foliage throughout UTAH.

GRAPE MEALYBUG (*Pseudococcus maritimus*) was heavy on grapes in San Joaquin County, CALIFORNIA.

A CECIDOMYIID MIDGE (*Lasioptera vitis*) was the heaviest on small fruits in several years in NEW HAMPSHIRE. CURRANT FRUIT FLY (*Epochra canadensis*) infested gooseberries and currants at Livingston, Park County, and at Jordan, Garfield County, in MONTANA.

IMPORTED CURRANTWORM (*Nematus ribesii*) infested some black and amber currants in UTAH. GRAPE SAWFLY (*Erythraspides vitis*) caused light to moderate damage on grapes in Washington County, TENNESSEE, during late August and early September.

A MITE complex was prevalent on strawberries in the Bradenton area of Manatee County, FLORIDA. Mites were severe on strawberries in the Homestead area of Dade County, and effective controls were needed. An ERIOPHYID MITE (*Phyllocoptes wisconsinensis*) distorted leaves in a planting of cultivated elderberries in Crawford County, PENNSYLVANIA, for a new county record. SPIDER MITES (*Tetranychus* spp.) often discolored red currant and raspberry foliage in UTAH. TWO-SPOTTED SPIDER MITE (*T. urticae*) was a serious pest of strawberries in all CALIFORNIA growing areas. CYCLAMEN MITE (*Steneotarsonemus pallidus*) damaged strawberries in Santa Barbara County, and GRAPE ERINEUM MITE (*Eriophyes vitis*) was locally severe in El Dorado and Sonoma Counties. REDBERRY MITE (*Acalitus essigi*) caused substantial yield reductions in improperly sprayed blackberry fields in the Willamette Valley of OREGON.

SLUGS (*Deroceras* spp.) damaged strawberries on many occasions in OHIO during the 1968 season.

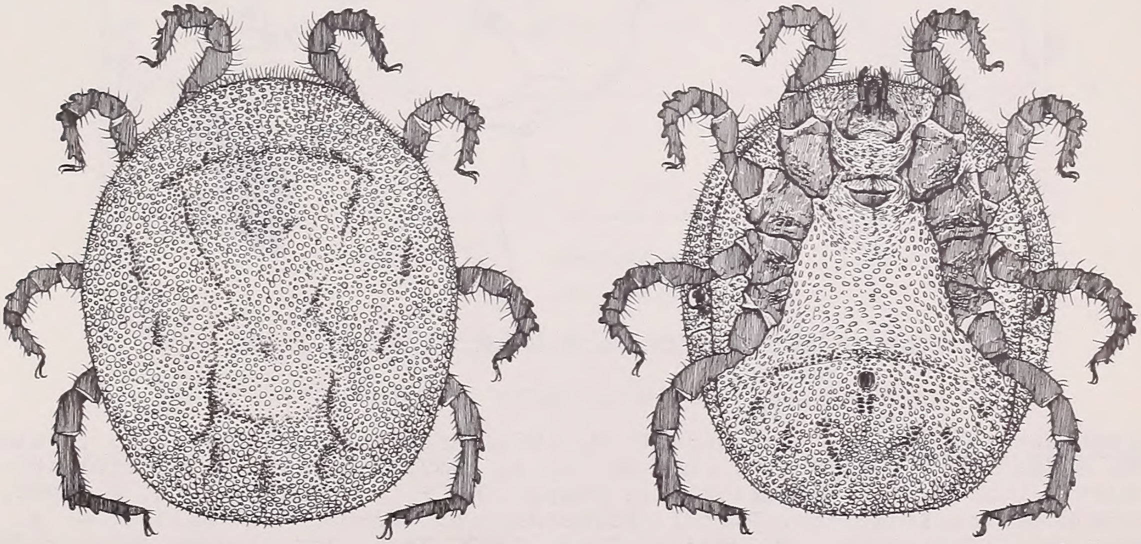
INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

EYELESS TAMPANS (*Ornithodoros moubata* (Murray) complex)

Economic Importance: Certain members of this group are vectors of African tick-borne relapsing fever (*Borrelia duttoni*) of man in East, Central, and South Africa. Although the disease is hyperendemic, it sometimes reaches epidemic proportions and many deaths have occurred. This rather severe disease is accompanied by a high fever lasting a few days but relapses quickly follow. In the United States, *O. parkeri* Cooley, *O. hermsi* Wheeler, Herms and Meyer and *O. turicata* (Dugès) are vectors of human relapsing fever in the Southwest. Bites of African eyeless tampans may be quite irritating. In 1964, over one million huts infested with these ticks were reported in Tanzania alone. Aside from huts, *O. moubata* complex may be annoying in rest and labor camps and places such as coffeehouses where people congregate. These species apparently have been willfully distributed (at times) when migrant workers leave home for long periods. They carry ticks which they allow to feed on themselves to preserve their immunity to the disease. These pests, which are easily concealed, also have been spread through commercial channels such as potato baskets and household goods. Domestic pigs are important hosts of some species and often harbor large quantities of these ticks. In Malawi, eyeless tampans have been suspected of causing death among pigs. According to Walton, *O. moubata* is a complex of species in which several biological and morphological differences have been noted.

Distribution: Angola, Botswana, Burundi, Congo (Kinshasa), Ethiopia, Ghana, Kenya, Malagasy Republic, Malawi, Mozambique, Republic of South Africa, Rwanda, Sierra Leone, Somalia, Southwest Africa, Southern Rhodesia, Sudan (limited small areas), Tanzania, Uganda, and Zambia.

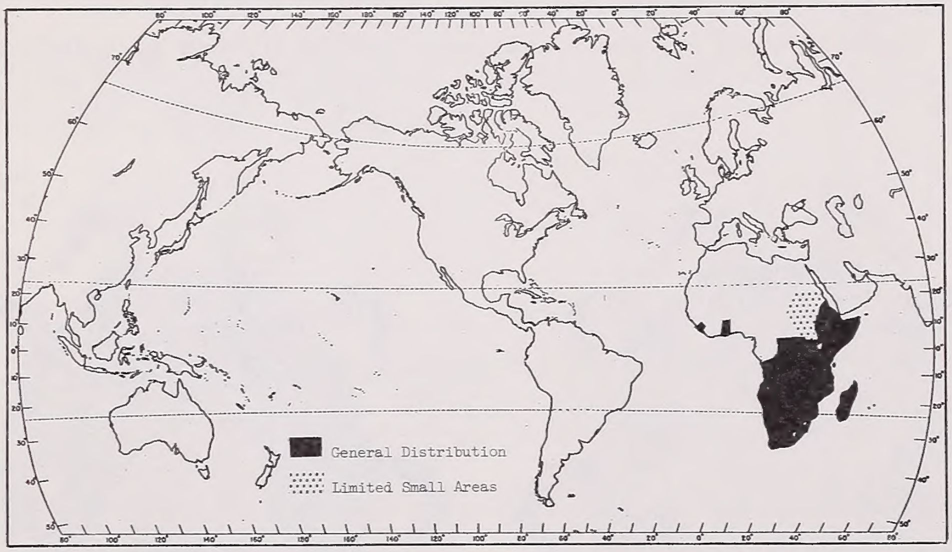
Hosts: Man, domestic pigs, chickens, warthogs, South African tortoises and snakes.



Dorsal and ventral views of female *Ornithodoros porcinus porcinus* Walton, one of the species of the *O. moubata* complex in Africa. (Illustrations--courtesy of H. Hoogstraal)

Life History and Habits: Following mating, the female takes a blood meal and deposits eggs in 5-25 days. Oviposition usually occurs only after a blood meal and feeding sometimes takes place before mating. Parthenogenesis rarely occurs; when it does, the progeny are all females. Eggs are emitted singly from the genital opening and come in contact with a glandular organ providing each with a waxy, waterproof coating. Those which fail to get coated do not hatch. Ten to over 250 eggs per batch have been recorded and one female usually deposits 6-7 batches. Following the egg stage, which lasts about 8 days, larvae emerge but do not feed. In fact, they are nonmotile and remain quiescent until the nymphal molt, a few hours to 5 days later. Eyeless tampans are among the few ticks known to have an inactive larval stage. Nymphs are quite active and pass through 4-8 instars before becoming adults. Although the first nymphal stage requires about 8 days at room temperature, subsequent ones require a longer time. Males complete the life cycle in a minimum of 60 days and females 73 days. The life cycle may be greatly prolonged depending upon delayed feeding and mating. *O. moubata* complex is more resistant to desiccation than most ticks. Moreover, unfed specimens have been kept alive for five years.

Description: ADULT - Length about 8 mm. but engorged females may reach 11 mm. Eyeless. Color, dusty brown to greenish with few ochreus patches, but after engorging becomes darker. Integument granular. Genital opening, short and rounded in males but a broad slit in females, situated between the first pair of legs. EGG - 0.9 x 0.8 mm. One of the largest known of tick eggs. Slightly ovoid, glistening golden yellow when first laid. Eggs from older females light to dark brown. LARVA - About 1 mm., not capable of movement but with most essential structures as in larval ticks. Mouth parts degenerate. Color dull purplish brown. NYMPH - Flattened, subcircular and ochreus in color. Minute spiracle between legs III and IV. No genital opening.



General Distribution of *Ornithodoros moubata* (Murray) Complex

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